NOTE BY THE EDITOR.—As it has been objected that, in the equation we gave, on page 143, (No. 5) of the parallel curve to an ellipse, our result was not satisfactory because the equation involved explicitly only one of the coordinates; we therefore add, as a supplement to that note, the following:

By similar triangles (see fig. on p. 143) we have

$$y - y' : x - x' :: y : ON' \quad . \; . \; . \; . \; . \; . \quad (1')$$

Also, from the differential triangle,

$$(dx^2 + dy^2)^{\frac{1}{2}} : dy :: N : ON' \quad . \; . \; . \; . \; . \; . \quad (2')$$

From (1′) and (2′) we get

$$N = \frac{(x-x')y}{y-y'}\sqrt{\left(1+\frac{dx^2}{dy^2}\right)} = \frac{(x-x')y}{y-y'}\sqrt{\left(1+\frac{a^4-a^2x^2}{b^2x^2}\right)}.$$

Writing q for $N' \div (N' + c)$, we get by reduction,

$$x' = x - \frac{N(1-q)bx}{\sqrt{[a^4-(a^2-b^2)x^2]}}.$$

Substituting for y, in the equation of the ellipse, its value from (2), (p. 143) we have $x = \frac{a}{b}\sqrt{\left(b^2 - q^2y'^2\right)}$; and putting this value of x for x, in the last equation above, and for N', as involved in q, and N, their values in functions of y' from the equation given on page 143, we obtain an equation involving only as variables the coordinates x' and y'.

PROBLEMS.

92. BY A. W. MASON, CEDAR FALLS, IOWA.—A balloon is ascending vertically with a given velocity v, and a body is let fall from it, which touches the ground in t seconds; find the height of the balloon at the moment the body is let fall fron it.

93. BY PROF. J. SCHEFFER.—To construct a triangle if the three radii of the circles, which touch the three sides externally, be given.

94. BY PROF. W. W. JOHNSON.— One side of a quadrilateral, whose four sides are given in length, is fixed: find the equation of the locus of the middle point of the opposite side, in rectangular coordinates.

95. BY DR. A. B. NELSON, DANVILLE, KY. — Prove, otherwise than by the Integral Calculus that

$$\frac{\pi}{2} - \sin^{-1}e = 2\tan^{-1}\left(\frac{1-e}{1+e}\right)^{\frac{1}{2}}.$$

96. By Chas. P. Saxe, Gold Hill, Nevada. — A plays m games with B whose skill is equal to his own. Required the probability that one of them will win n consecutive games.

97. By Henry Gunder, North Manchester, Ind. — Find the average distance of all the points of a sphere, radius r, from a point whose distance from the center is a.

Query. By G. W. Hill.—In De Haan's Tables of Definite Integrals, Edition of 1867, p. 317, there is found this equation

$$\int_0^{\frac{\pi}{2}} \frac{x \sin x}{(1 - p^2 \sin^2 x)^{\frac{3}{2}}} dx = \frac{\sin^{-1} p}{p(1 - p^2)},$$

how prove this?

Editorial Announcement. — As this number completes Vol. II, we take this opportunity to announce that we have made definite arrangements for the continuation of the Analyst at least another year, and we hope, for several years.

It is not our purpose to boast of the character of our publication, as we are fully aware of its many defects, but we are pleased to know that many of the best mathematicians in the country give us their active support, both by way of contributions for publication, and pecuniary aid: As, for instance, Mr. Hill, who has enriched our pages with many valuable articles and solutions, has contributed to this No. a very interesting, and some what extended, article; and, as it occupies more space than is in general allowed to any one contributor in the same No., he has generously allowed us to add 8 pages to the No. at his expense; thus enabling us to present to our readers a No. of 40 pages, without increase of cost to them or expense to us.

We have thought several times during the past two years that an apology was due for the quality of the paper used in some of the numbers. We dislike apologies, however, and will only state that we *paid* for good paper. We take pleasure in saying, in this connection, that, by the kindness of the Secretary of State, we have been permitted to include our purchase of paper for Vol. III, with the purchase made for the state, whereby we have obtained, at a reduced price, a superior article of paper; as will appear by inspection of the last two sheets of this No.

We desire to retain *all* our present subscribers, and would be pleased if each of them would procure for us an *additional* one or more, but, in case any of our present subscribers intend to discontinue their subscriptions at the end of Vol. II, we ask as a favor, as well as an act of justice to us, that they notify us *before the first of December*, 1875.